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EXAMINER	
SUGENT, JAMES F	
ART UNIT	PAPER NUMBER
2116	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/727,319	HUANG ET AL.	
	Examiner	Art Unit	
	James Sugent	2116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☒ Claim(s) *15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 15 recites the limitation "said controller devices" in line 5. There is insufficient antecedent basis for this limitation in the claim. The Examiner asserts the intention of the Applicant was to claim "controlled devices." Please change "said controller devices" to "said controlled devices" in line 5 of claim 15.

Appropriate correction is required. The following Office Action will be examined based upon the correction requests stated above.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 3, 10 and 11 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 8-10, 16 and 18-19 of copending Application No. 10/727,320 (hereinafter referred to as '320). Although the conflicting claims are not identical, they are not patentably distinct from each other because:

- In re claim 1 of the instant invention, all elements map to other claim elements of '320 as shown below:
  - Elements "A device controller for coupling one or more controlled devices to one or more processors in a processing system, comprising: a command unit for sending commands to said one or more device; " of the claim 1 of the instant invention are nearly identical to "A device controller for coupling a group of devices to one or more processors in a processing system, comprising: a command unit for sending commands to a said one or more devices" found in claim 16 of '320. This is obvious since the instant invention claims "one or more controlled devices" whereas '320 claims "a group of devices" which is the same limitation but using different wording.
  - Remaining elements "at least one usage evaluator having an input coupled to an output of said command unit for evaluating a frequency of use of an associated controlled device; and control logic coupled to said usage evaluator and further coupled to an input of said command unit for sending power management commands in response to said usage evaluator detecting is that a usage level of said associated device has fallen below a

threshold level, whereby said device controller power manages said controlled device without intervention by said one or more processors" is nearly identical to the combination of "at least one control register for receiving a local maximum power consumption bound; and control logic coupled to said at least one control register and further coupled to an input of said command unit for sending power management commands consistent with maintaining a total power consumption of said group of devices below said local maximum bound, whereby said device controller power manages said group of devices without intervention by said one or more processors" of claim 16 of '320 and "comprising evaluators for evaluating a usage of each associated device in order to determine whether or not said usage of each device has fallen below a threshold, and wherein said control logic further determines said power management settings for each particular device in conformity with said measured usage for each particular device" of claim 19 of '320. This is obvious since the only difference is the instant invention only recites "evaluators" and '320 claims "registers" and "evaluators" that carry out the same task of evaluating device usage.

- Claim 3 of the instant invention is identical to claim 18 of '320.
- In re claim 10 of the instant invention, all elements map to other claim elements of '320 as shown below:

- Elements "A processing system, comprising: a processor; a memory coupled to said processor for storing program instructions and data values; a device controller coupled to said processor;" of claim 10 of the instant invention is nearly identical to "A processing system, comprising: a processor; a memory coupled to said processor for storing program instructions and data values; multiple device controllers coupled to said processor;" of claim 8 of the instant invention. This is obvious since the only difference of the instant invention is "a device controller" whereas '320 claims "multiple device controllers."
- Remaining element "one or more controlled devices coupled to said device controller, wherein said controlled devices have multiple power management states, and wherein said device controller includes a command unit for sending commands to said one or more devices, at least one usage evaluator having an input coupled to an output of said command unit for evaluating a frequency of use of an associated controlled device, and control logic coupled to said usage evaluator and further coupled to an input of said command unit for sending power management commands in response to said usage evaluator detecting that a usage level of said associated device has fallen below a threshold level, whereby said device controller power manages said controlled device without intervention by said processor." of claim 10 of the instant invention is nearly identical to the combination of "a plurality of groups of controlled devices, each group

coupled to an associated one of said device controllers, wherein said controlled devices have multiple power management states, and wherein said device controllers each include a command unit for sending commands to said associated devices, whereby said devices are power managed by said associated controller" of claim 8 of '320 and "wherein said device controllers further comprise evaluators for evaluating a usage of each associated device in order to determine whether or not said usage of each device has fallen below a threshold, and wherein said control logic further determines said power management settings for each particular device in conformity with said measured usage for each particular device" of claim 10 of '320. This is obvious since all elements of claim 10 in the instant invention, shown hereinabove, are mapped to claim elements from claim 8 and claim 10 associated with '320.

- Claim 11 of the instant invention is identical to claim 9 of '320.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-20 are rejected under 35 U.S.C. 102(b) as being highly anticipated by Faucher et al. (U.S. Patent No. 5,404,543) (hereinafter referred to as Faucher).

As to claim 1, Faucher discloses a device controller (memory controller 20) for coupling (via bus 42) one or more controlled devices (memory modules 30 of memory bank 22) to one or more processors (system CPU 12 and main CPU machine 54) in a processing system (column 3, lines 33-42 and column 3, line 51 thru column 4, line 3 and column 4, lines 25-57), comprising: a command unit (system memory machine 60) for sending commands (RAS and CAS) to said one or more devices (via control bus 36; column 4, lines 25-40 and column 5, lines 54-66); at least one usage evaluator (power management machine 66) having an input coupled (via control bus 36) to an output of said command unit (60) for evaluating a frequency of use of an associated controlled device (Faucher discloses the power management machine [66] comprising counters [one associated for every memory module 30] to establish the "length of time" [hence frequency], since a memory module [30] was used; column 7, lines 38-58); and control logic (power management machine 66) coupled to said usage evaluator (The power management machine [66] and power management scoreboard [64] disclosed by Faucher comprises the functionality listed for both said usage evaluators and control logic as state above) and further coupled to an input of said command unit (Faucher discloses the command unit [system memory machine 60] accommodating various cycles in correlation with control logic [power management machine 66] which necessitates the coupling of these two to each other; column 5, lines 56-61) for sending power management commands in response to said usage evaluator detecting is that a usage level of said associated device has fallen below a threshold level (pre-established time period), whereby said device controller power manages (alters voltage delivered to memory

modules [30]) said controlled device without intervention by said one or more processors (Faucher discloses a power saving method wherein if a memory module [30] has not been accessed within said pre-determined time period then the device controller [memory controller 20] and control logic [power management machine 66] place the memory bank [22] into a lower power mode; column 12, line 67 thru column 13, line 6 and column 13, line 67 thru column 14, line 21) (Though Faucher does not explicitly recite the power managing mode altered in relation to a usage level falling below a threshold, it is well known that if the time since the last access to a device has increased then the frequency of usage has decreased. Hence, if the time period since last access has increased, then frequency of usage has decreased wherein if the frequency of usage has fallen below a threshold [pre-determined time period] then the voltage level to that memory module will be placed into a lower power mode by decreasing the voltage level to the memory module).

As to claim 2, Faucher discloses the device controller further comprising: an output port coupled to said at least one usage evaluator for reading a state of said at least one usage evaluator, whereby a state of said at least one usage evaluator may be stored external to said device controller (Faucher discloses the state of each memory module [30] being stored within registers [70, 72 and 74] of scoreboard [64] to be used for memory management to include power saving data that is used outside of memory controller [20] and sent to scoreboard [64] for updating purposes; column 4, lines 25-57 and column 6, lines 10-20 and column 6, line 56 thru column 7, line 16); and an input port coupled to said at least one usage evaluator for setting a state of said at least one usage evaluator, whereby said state of said at least one usage evaluator may be restored from information stored external to said device controller (Faucher discloses the

state of each memory module [30] being stored within registers [70, 72 and 74] of scoreboard [64] to be used for memory management to include power saving data that is used outside of memory controller [20] and sent to scoreboard [64] for updating purposes; column 4, lines 25-57 and column 6, lines 10-20 and column 6, line 56 thru column 7, line 16).

As to claim 3, Faucher discloses the device controller wherein said device controller is a memory controller, and wherein said controlled devices are memory modules (column 3, lines 33-42 and column 4, lines 51-55 and column 4, lines 25-40).

As to claim 4, Faucher discloses the device controller wherein said at least one usage evaluator comprises an inter-arrival time counter for determining an interval between accesses to said associated memory module (column 7, lines 38-58).

As to claim 5, Faucher discloses the device controller further comprising one or more power management control registers (70, 72 and 74), each associated with a particular one of said one or more controlled devices (column 6, lines 10-55 and column 7, lines 3-16), each coupled to an input port of said device controller and further coupled to said command unit, whereby a power management control state for said associated controlled device can be set by said one or more processors (54) and set in said associated controlled device by said device controller (column 5, lines 13-24).

As to claim 6, Faucher discloses the device controller wherein said power management control registers are further coupled to said at least one usage evaluator, whereby values of said power management control registers are adjusted in conformity with a result of said evaluating (steps 108, 116, 120, 128 and 134 in figures 5 and 6 reveal the scoreboard [54] being updated after changes made).

As to claim 7, Faucher discloses the device controller wherein said evaluator further comprises an adaptive threshold circuit for adjusting said threshold in response to said evaluated frequency of use of said one or more controlled devices (Faucher discloses changing a threshold [time-out value] dependent on whether system is operating on AC or DC power; column 6, lines 48-55).

As to claim 8, Faucher discloses the device controller wherein said one or more controlled devices include a counter for determining a level of usage of each controlled device during a current process, and wherein said device controller further comprises an input port coupled to each of said controlled devices for reading a value of said counter, and wherein said control logic updates said at associated evaluator in conformity with said value of said counter (column 7, lines 38-58).

As to claim 9, Faucher discloses the device controller wherein said device controller is a memory controller, wherein said controlled devices are memory modules (column 3, lines 33-42 and column 4, lines 51-55 and column 4, lines 25-40) incorporating usage counters (column 7, lines 41-45), and wherein said control logic is coupled to said command logic whereby said control logic periodically reads current counts from said memory modules (column 4, lines 25-57).

As to claim 10, Faucher discloses a processing system (10), comprising: a processor (system CPU 12 and main CPU machine 54); a memory (memory bank 22 consisting of memory modules 30) coupled to said processor for storing program instructions and data values (column 3, lines 33-42 and column 4, lines 25-40); a device controller (memory controller 20) coupled to said processor (column 3, lines 33-50); one or more controlled devices (memory modules 30

within memory bank 22) coupled to said device controller (via buses 32, 34 and 36; column 4, lines 25-40), wherein said controlled devices (memory modules 30) have multiple power management states (column 1, lines 39-49), and wherein said device controller (memory controller 20) includes a command unit (system memory machine 60) for sending commands (RAS and CAS) to said one or more devices (via control bus 36; column 4, lines 25-40 and column 5, lines 54-66), at least one usage evaluator (power management machine 66) having an input coupled (via control bus 36) to an output of said command unit for evaluating a frequency of use of an associated controlled device (column 7, lines 38-58), and control logic (power management machine 66) coupled to said usage evaluator (The power management machine [66] and power management scoreboard [64] disclosed by Faucher comprises the functionality listed for both said usage evaluators and control logic as state above) and further coupled to an input of said command unit (Faucher discloses the command unit [system memory machine 60] accommodating various cycles in correlation with control logic [power management machine 66] which necessitates the coupling of these two to each other; column 5, lines 56-61) for sending power management commands in response to said usage evaluator detecting that a usage level of said associated device has fallen below a threshold level (pre-established time period), whereby said device controller power manages said controlled device without intervention by said processor (Faucher discloses a power saving method wherein if a memory module [30] has not been accessed within said pre-determined time period then the device controller [memory controller 20] and control logic [power management machine 66] place the memory bank [22] into a lower power mode; column 12, line 67 thru column 13, line 6 and column 13, line 67 thru column 14, line 21) (Though Faucher does not explicitly recite the power managing mode altered

in relation to a usage level falling below a threshold, it is well known that if the time since the last access to a device has increased then the frequency of usage has decreased. Hence, if the time period since last access has increased, then frequency of usage has decreased wherein if the frequency of usage has fallen below a threshold [pre-determined time period] then the voltage level to that memory module will be placed into a lower power mode by decreasing the voltage level to the memory module).

As to claim 11, Faucher discloses the processing system wherein said device controller is a memory controller, and wherein said controlled devices are memory modules (column 3, lines 33-42 and column 4, lines 51-55 and column 4, lines 25-40).

As to claim 12, Faucher discloses the processing system wherein said device controller further comprises: an output port coupled to said at least one usage evaluator for reading a state of said at least one usage evaluator by said processor, whereby a state of said at least one usage evaluator may be stored in said memory by said processor (Faucher discloses the state of each memory module [30] being stored within registers [70, 72 and 74] of scoreboard [64] to be used for memory management to include power saving data that is used outside of memory controller [20] and sent to scoreboard [64] for updating purposes; column 4, lines 25-57 and column 6, lines 10-20 and column 6, line 56 thru column 7, line 16); and an input port coupled to said at least one usage evaluator for setting a state of said at least one usage evaluator by said processor, whereby said state of said at least one usage evaluator may be restored from said memory (Faucher discloses the state of each memory module [30] being stored within registers [70, 72 and 74] of scoreboard [64] to be used for memory management to include power saving data that

is used outside of memory controller [20] and sent to scoreboard [64] for updating purposes; column 4, lines 25-57 and column 6, lines 10-20 and column 6, line 56 thru column 7, line 16).

As to claim 13, Faucher discloses the processing system wherein said at least one usage evaluator comprises an inter-arrival time counter for determining an interval between commands sent to said associated controlled device (column 7, lines 38-58).

As to claim 14, Faucher discloses the processing system wherein said device controller further comprises one or more power management control registers (70, 72 and 74), each associated with a particular one of said one or more controlled devices (column 6, lines 10-55 and column 7, lines 3-16), each coupled to an input port of said device controller and further coupled to said command unit, whereby a power management control state for said associated controlled device can be set by said processor (54) and set in said associated controlled device by said device controller (column 5, lines 13-24).

As to claim 15, Faucher discloses a method of managing power in a processing system (column 1, lines 39-49), comprising: sending power management setting information for devices (memory modules 30 of memory bank 22) controlled by a device controller (memory controller 20) to said device controller (column 4, lines 25-57); evaluating a usage (track length of time since last access via counters) of each of said controlled devices (memory modules 30 of memory bank 22) within said device controller (via power management machine [66] found within memory controller [20]) in order to determine whether or not said usage has fallen below a threshold (Though Faucher does not explicitly recite the power managing mode altered in relation to a frequency falling below a threshold, it is well known that if the time since the last access to a device has increased then the frequency of usage has decreased. Hence, if the time

period since last access has increased, then frequency of usage has decreased wherein if the frequency of usage has fallen below a threshold [pre-determined time period] then the voltage level to that memory module will be placed into a lower power mode by decreasing the voltage level to the memory module; column 7, lines 38-58 and column 13, line 67 thru column 14, line 21); and sending power management commands ("number of inputs from memory controller") from said device controller to said controlled devices (via programmable memory power system [24]; column 3, line 51 thru column 4, line 3) in conformity with a result of said determining, whereby said device controller manages a power management state of said controlled devices without processor intervention (Faucher discloses a power saving method wherein if a memory module [30] has not been accessed within said pre-determined time period then the device controller [memory controller 20] and control logic [power management machine 66] place the memory bank [22] into a lower power mode; column 12, line 67 thru column 13, line 6 and column 13, line 67 thru column 14, line 21).

As to claim 16, Faucher discloses the method further comprising: receiving an indication of a context switch activating a second process and deactivating a first process; and in response to said receiving, saving a state of said evaluating, whereby said state may be restored at a subsequent context switch (Faucher discloses "a system command/interrupt, such as a power interrupt, a system operation or switch" therefore, a context switch; column 9, lines 56-66).

As to claim 17, Faucher discloses the method further comprising: second receiving a second indication of a second context switch reactivating said first process; in response to said second receiving, restoring said saved state of said evaluating, whereby said evaluating commences from the previously stored state (Figures 6 and 7 reveal flow of processing returning

back to a previous state after steps 104 and 164 respectively such that a previous process commences; column 10, lines 43-48 and column 13, lines 46-56).

As to claim 18, Faucher discloses the method further comprising retrieving usage counts from said controlled devices, and wherein said evaluating is performed in conformity with said retrieved usage counts (column 7, lines 38-58).

As to claim 19, Faucher discloses the method further comprising adjusting said threshold in accordance with a result of said evaluating, whereby said evaluating is made adaptive to said usage (Faucher discloses changing a threshold [time-out value] dependent on whether system is operating on AC or DC power; column 6, lines 48-55).

As to claim 20, Faucher discloses the method wherein said device controller is a memory controller, wherein said controlled devices are memory modules (column 3, lines 33-42 and column 4, lines 51-55 and column 4, lines 25-40), wherein said sending sends power management setting information to said memory modules, and wherein said evaluating determines a frequency of accesses to said memory modules (column 7, lines 41-45) (Faucher discloses a power saving method wherein if a memory module [30] has not been accessed within said pre-determined time period then the device controller [memory controller 20] and control logic [power management machine 66] place the memory bank [22] into a lower power mode; column 12, line 67 thru column 13, line 6 and column 13, line 67 thru column 14, line 21) (Though Faucher does not explicitly recite the power managing mode altered in relation to a usage level falling below a threshold, it is well known that if the time since the last access to a device has increased then the frequency of usage has decreased. Hence, if the time period since last access has increased, then frequency of usage has decreased wherein if the frequency of

usage has fallen below a threshold [pre-determined time period] then the voltage level to that memory module will be placed into a lower power mode by decreasing the voltage level to the memory module).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Sugent whose telephone number is (571) 272-5726. The examiner can normally be reached on 8AM - 4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Browne can be reached on (571) 272-3670. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

James Sugent
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March 31, 2006

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